Changes to the 2021 GAAMPs for approval and use in 2022

Below is a summary of changes that the corresponding Advisory Committees are proposing to the Michigan Commission of Agriculture and Rural Development for adoption in the 2022 Generally Accepted Agricultural Management Practices.

Summary of *Care of Farm Animals GAAMPs* proposed changes:

- Minor text changes throughout related to flow, formatting, and updates to references and research.
- Most livestock sections added a section related to depopulation of livestock in response to urgent circumstances (pages 8, 19, 25, 34, 43, 52, 58, 65, 70, 76, 85, 94,101).

Additional changes were included in the following sections:

- Beef Cattle and Bison:
    - Language added related to housing types (Manure Management and Sanitization section; on page 5).
    - Language added related to observing livestock and ensuring livestock have feed and water (Health care and medical procedures section; page 7).

- Sheep and Goats
    - Revised language related to: water requirements and Management language updates (page 55).

- Domestic Rabbits
    - Added language in the nutrition section focusing on feed restriction and digestive disorders (page 72).
    - Added language related to transport duration (page 73).

- Aquaculture:
    - Language added related to shipping, transport, and handling recommendations (pages 88 and 89)
    - Language added to better illustrate dissolved O_2 level considerations in cold and warm water fish (pages 87,90,91).
    - Language added discussing Nitrogen saturation concerns (page 91).
    - Language added for better description of health care and sick animals (page92).

- Apiary Management (pages 104 – 120):
    - Overhaul of chapter including:
        - Re-vamped Overview

        - In the Management practices section:
            - Addition of the following subsections:
                - Handling
                - Nutrition
                - Hive Orientation
                - Facilities and equipment
            - Removal of the following subsections:
                - Social structure
                - Internal and external factors related to foraging behavior
            - Revision of language in the following sections:
                - Hive Density recommendations
                - Recommendations for neighbor relations,
                - Hive placement
                - Swarming
                - Provision of water
                - Queens
                - Robbing transportation of bees
                - Use of consolidation yards
    - Health Care section :
        - Revision of language in the following subsections:
            - Language added addressing disease control
            - Language added describing minimizing pesticide exposure during pollination
        - Language added addressing Euthanasia
    - Removal of definitions page

Summary of *Farm Market GAAMPs* proposed changes:

Text from “PHYSICAL CHARACTERISTICS OF A FARM MARKET” and the “USE OF SPACE” paragraph on page 3 was relocated to the DEFINITIONS section on page 2, under “Farm Market.”

Farm Market – A farm market is a year-round or seasonal location where transactions and marketing activities between farm market operators and customers take place. ~~-~~A farm market may be a physical structure such as a building or tent, or simply an area where a transaction between a customer and a farmer is made. The farm market does not have to be a physical structure. The farm market must be located on property owned or controlled (e.g., leased) by the producer of the products offered for sale at the market. ~~While the location must take place on property controlled by the affiliated farm, it does not have to be a physical structure such as a building.~~ Fresh products as well as processed products may be sold at the farm market. At least 50 percent of the products offered must be produced on and by the affiliated farm measured by retail floor space during peak production season, or 50 percent of the average gross sales for up to the previous five years or as outlined in a business plan. Processed products will be considered as produced on and by the farm if at least 50 percent of the product’s primary or namesake ingredient was produced on and by the farm, such as apples used in apple pie, maple sap in maple syrup, strawberries in strawberry jam, etc.

PHYSICAL CHARACTERISTICS OF A FARM MARKET

~~**Use of space**~~**Location**

~~A farm market may be a physical structure such as a building or tent, or simply an area where a transaction between a customer and a farmer is made. The farm market must be located on property owned or controlled (e.g., leased) by the producer of the products offered for sale at the market. All retail space, farm market structures, and locations where transactions occur, at a~~A new or expanding farm market~~,~~ that ~~are~~ is greater than 120 square feet must meet a minimum setback of 165 feet from all non-farm residences. ~~and a~~

~~Il n~~New or expanding farm markets are not authorized under this GAAMP on platted lots within a subdivision created under the Michigan Land Division Act (Act 288 of 1967, MCL 560.101, *et seq.*) or preceding statues and on condominium units within a condominium (sometimes referred to as “site-condos”) created under the Michigan Condominium Act (Act 59 of 1978, MCL 559.101, *et seq.*).~~,~~ ~~H~~however, farm markets are permitted in such areas if authorized by association rules or pursuant to a local ordinance designed for that purpose, unless prohibited by association rules.

A farm market should have a written site plan for potential MDARD review that preempts local government regulations.

Summary of *Irrigation Water Use GAAMPs* proposed changes:

The Irrigation GAAMPs committee members focused on three different aspects of the irrigation GAAMPs for updates in 2022. These areas included Irrigation System Uniformity, Chemigation and Backflow Prevention, and Odor from Irrigation Water.

In SYSTEM MANAGEMENT Section, Irrigation Uniformity was addressed by

- Updated language in GAAMP #3 and GAAMP #4 (both on pg 3)

3. Evaluate the irrigation system uniformity.

~~The objectives of this procedure are to e~~Ensure the irrigation system hardware is in good operating condition and the irrigation system is built as designed. ~~is matched to the site conditions. It will also indicate where system management can be improved so distribution uniformity and overall potential application efficiency is increased.~~ System uniformity evaluation involves 1) the overall condition of the system, and 2) how the design and management of this system work together to achieve high ~~or low~~ distribution uniformities and application efficiencies. ~~Checklists are available from NRCS, irrigation dealers, and MSUE, and can be used to evaluate the overall conditions of the irrigation system and to assure that all vital components are in place.~~

Observe the system at the time of construction to ensure the system as built matches the design. After any major repair work involving the water distribution equipment, observe the sprinklers or distribution equipment to make sure the repair stays true to the design. Replace sprinklers that will not apply water uniformly or that exhibit malfunction in water distribution pattern.

Ensure center pivot interlock systems are present that stop water flow if the distribution system stops moving.

4. Maintain the irrigation system in good working condition.

M~~The objective of this practice is to maximize the potential application efficiency by m~~aintain~~ing~~ the sprinkler system so that it operates as designed. An important aspect of uniformity is to make sure every component is in good operating condition ~~and the nozzles/emitters are not worn~~. Regular ~~inspection~~ observation for ~~obvious~~ visible equipment malfunctions such as leaky pipelines or riser gaskets should take place. Make sure cornering arm or Z arm control integrity is maintained when the system is used and repair any malfunction identified. ~~The system should be periodically inspected for leaky pipeline or riser gaskets. Leaks can result in a significant loss of water. Deep percolation from leaking pipes could leach nutrients or chemicals to groundwater. Pressure should be checked in the system regularly.~~

- Updated language in GAAMP #5 (pg 3 & 4)

5. ~~**Pressure variations can be an early indication of problems with a pump that could indicate a malfunctioning or an incorrectly set valve. Correct system pressure is essential for efficient operation. Keep a record of when inspections are made. Systems that link active pumping with forward movement of the irrigation system can improve water use and energy efficiency and avoid over-application. Operate sprinkler systems to minimize drift and off-target application.**~~**Accurately measure irrigation system supply pressure at the manifold for each distribution system.**

Observe pressure at start up in the spring and at mid-season or time of peak use. Correct malfunctions or leaks that have resulted in water supply pressure being out of design parameters. Pressure variations can be an early indication of problems with a pump, indicate a supply line leak or malfunction, or an incorrectly set valve. Correct system pressure is essential for efficient operation.

- Added a new bolded entry GAAMP #6 (pg 4)

6. **Operate sprinkler systems to minimize drift and off-target application.**

~~The objective of this practice is to reduce the detrimental effects of wind on application uniformity and~~Systems should be both designed and managed to avoid off-target application of water. Observe the system at start up to minimize ~~High winds can greatly reduce application uniformity and wastewater. Avoiding operation under high wind situations will improve application uniformity and reduce the potential for water applications to non-target areas. Care should be taken to avoid~~ drift or direct spraying of water over roads, adjacent property, or structures due to system placement or high winds. Observe end guns at start up to ensure they are operating as designed to avoid over- or under-application of water.~~Systems should be both designed and managed to avoid off-target application that does not fall on the irrigated field.~~

- Backflow Prevention
  - Language added to #24 (formerly #24)
  - Language added (new bullets #25 and #26)

24. **Incorporate appropriate backflow-prevention safety devices if a chemigation system is used.** **A chemigation valve contains a functional check valve, vacuum relief valve, and a low-pressure drain.**

25. **Irrigation systems used for applying chemigation should have a properly installed, maintained, and tested chemigation valve, reduced pressure zone valve, or air gap. An air gap is twice the diameter of the fill pipe or 6 inches, whichever is greater. Repair or replacement of any nonfunctioning components should be done with a professionally manufactured valve.**

26. **The chemigation check valve device should be inspected by the operator annually to ensure it is working properly and written records of the inspection must be maintained for a minimum of five years.**

The annual test shall consist of the following:

- Opening the inspection port and checking the condition of the check valve seat and the internally loaded (i.e., spring) check is functioning.
- With the system pressurized and the well pump off, remove the low-pressure drain to ensure the main check valve is not leaking. *[This may only be possible for vertical turbine pump systems.]*
- Visual inspection of the air/vacuum relief, low-pressure drain and plunger, low-pressure drain hose, and injection line check valve for signs of failure.

Summary of *Manure Management and Utilization and GAAMPs* proposed changes

The Manure GAAMPs Advisory Committee focused on making the language in these GAAMPs more understandable to the Agricultural Community as well as the general public.

- In RUNOFF CONTROL AND WASTEWATER MANAGEMENT Section, removal of ambiguity contained in GAAMP 1 (pg 2).

RUNOFF CONTROL AND WASTEWATER MANAGEMENT

Rainfall and snowfall-induced runoff from uncovered livestock facilities (regardless of the facility's surface characteristics) requires control to protect neighboring land areas and prevent direct discharge to surface or groundwaters. Livestock facilities, which require runoff control, include all holding areas where livestock density precludes sustaining vegetative growth on the soil surface.

1. ~~**Facilities may be paved, partially paved around waters and feed bunks, or unpaved.**~~
1. **Runoff control is required for any facility if runoff from a lot leaves the owner's own property or adversely impacts surface and/or groundwater quality. Examples include runoff to neighboring land, a roadside ditch, a drain ditch, stream, lake, or wetland.**

- In RUNOFF CONTROL AND WASTEWATER MANAGEMENT Section, language revised to provide consistency across the document (pg 2).

2. **Milk parlor and milk house wastewater shall be managed in a manner to protect groundwater and surface waters.** ~~**prevent pollution to waters of the state.**~~
3. ~~**Provisions should be made to control and/or treat l**~~**Leachate and runoff from stored manure, silage, food processing by-products, or other stored livestock feeds shall be managed in a manner to protect groundwater and surface waters.**

For runoff control and wastewater management guidance, refer to the USDA Natural Resources Conservation Service (NRCS) Michigan (MI) Conservation Practice Standard *Waste Treatment 629* (USDA-NRCS-MI Field Office Technical Guide [FOTG]), chapter 4 of *Livestock Waste Facilities Handbook 3rd Edition*, (MidWest Plan Service, 1993), the *Guideline for Milking Center Wastewater* (Wright and Graves, 1998) and the *Milking Center Wastewater Guidelines* (Holmes and Struss, 2009). For construction Design standards and

specifications, see GAAMP Number 19, Construction design for manure storage, runoff storage, and treatment facilities must meet standards and specifications.

- In RUNOFF CONTROL AND WASTEWATER MANAGEMENT Section, the removal of redundancy in GAAMP 4 (pg 3) that is addressed later in the GAAMPs

Storage Facilities for Runoff Control

Runoff control can be achieved by providing facilities the option to collect and store the runoff for later application to cropland.

4. **Runoff storage facilities should be designed to contain normally occurring direct precipitation and resulting runoff and manure that accumulate during the storage times projected in the MMSP. In addition, storage volume should be provided that will contain the direct rainfall and runoff that occur as a result of the average 25-year, 24-hour rainfall event for the area. ~~Storage facilities must be constructed to reduce seepage loss to acceptable levels.~~**

Refer to the NRCS-MI Conservation Practice Standard *Waste Storage Facility 313* for controlling seepage from waste impoundments (USDA-NRCS-MI FOTG). Additional guidance can also be found in Chapter 10, Appendix 10D of the *Agricultural Waste Management Field Handbook (AWMFH),* Part 651, (USDA-NRCS, 2008).

Land Application of Wastewater and Runoff

Equipment must be available for land application of stored runoff wastewater. Land application should be done when the soil is dry enough to accept the water.

5. **Application rates should be determined based upon the ability of the soil to accept and store the runoff and wastewater and the ability of plants growing in the application area to utilize nutrients. Land application should be done when the wastewater can be used beneficially by a growing crop. On fields testing over 150 ppm P (300 lb. P/acre) soil test Bray P1, (202 ppm or 404 lb./acre Mehlich-3 P) there may be instances where on-farm generated wastewater, <1 percent solids, can be utilized if applied at rates that supply 75 percent or less of the annual phosphorus removal for the current crop or next crop to be harvested.**

- Within the ODOR MANAGEMENT section, revisions to provide management descriptions for farmstead stockpiling (pg 8,9).

  Farmstead Stockpiling

  Stockpiling manure at a farmstead is an acceptable practice that should be protective of the environment and mindful of neighbors. Manure should be stockpiled on a hard surface pad (such as concrete or asphalt) with sides to prevent leachate and runoff. Stockpiling manure on the ground is also an acceptable practice with appropriate management such as rotating locations and complete periodic removal of manure from the location annually or more frequently, records documenting timing of removal and location used, and seeding of the previous location after removal to allow for vegetation to take up the nutrients that have accumulated in the soil. Stockpile locations should remain vegetated without stockpiled manure for a minimum of three years before reusing the site. In addition, the stockpile should be in a location that does not allow for runoff to flow onto neighboring property or into surface waters. The location should also consider odors and pests if the stockpile is in close proximity to homes, schools or other high use areas. Practices such as covering stockpiled manure with a tarp, fleece blanket[1], straw, woodchips or other materials, planting or establishing a screen, shaping the stockpile into a conical shape, placing the stockpile to avoid overland flow of precipitation runoff, or using additives such as lime~~,~~ can be used to help reduce odors and pests. ~~Unless a tarp, fleece blanket1, or straw cover is maintained, manure stockpiles need to be kept at least 50 feet away from property lines or 150 feet away from non-farm homes.~~ Manure stockpiles need to be kept at least 150 feet from non-farm homes, if possible. If not possible, stockpiles need to be kept at least 50 feet from the property line or, if neither setback distance is possible, a tarp, fleece blanket[1], or straw cover must be maintained.

- Within the ODOR MANAGEMENT section, further clarifying definition of incorporation (pg 13).

  18. **Incorporate manure into soil during, or as soon as possible after, application. This can be done by (a) soil injection or (b) incorporation within 48 hours after a surface application when weather conditions permit. Incorporation may not be feasible where manures are applied to pastures, forage crops, wheat stubble, or where no-till practices are used to retain crop residues for erosion control.**

  Incorporation typically means the physical mixing or movement of surface applied manures and other organic byproducts into the soil profile so that a significant

amount of the material is not present on the soil surface. The physical mixing can be done by using minimal disturbance tillage equipment such as aeration tools. Incorporation also includesmeans the soaking of liquid materials into the soil profile by infiltration into soils that are not saturated and have void air space. These liquid materials include, but are not limited tomaterial being applied with irrigation water, barnyard manure runoff, liquid manure, silage leachate, milk parlor and house wash water/wastewater, and water, or liquids from a manure treatment process that separates liquids from solids into the surface soil layer by infiltration, thereby moving surface applied liquid into soils that have void air space not completely filled by soil water. These materials may be applied directly to soils or in combination with irrigation water using conventional manure application equipment or irrigation equipment

- Include Runoff Storage to CONSTRUCTION DESIGN AND MANAGEMENT FOR MANURE STORAGE, RUNOFF STORAGE, AND TREATMENT FACILITIES (pg 14)

CONSTRUCTION DESIGN AND MANAGEMENT FOR MANURE STORAGE, RUNOFF STORAGE, AND TREATMENT FACILITIES

Construction Design

19. **Construction design for manure storage, runoff storage, and treatment facilities must meet standards and specifications.**

- Within MANURE APPLICATION TO LAND section, update to include Tri-State Fertilizer Recommendations (pg 16)

Fertilizer Recommendations

23. **Use current fertilizer recommendations, consistent with those of Michigan State University (MSU), Tri-State Fertilizer Recommendations, or other appropriate recommendations to determine the total nutrient needs for crops to be grown on each field that could have manure applied.**

Fertilizer recommendations made by MSU Extension (Warncke *et al.*, 2009a and 2009b) or Tri-State Fertilizer Recommendations (Bulletin 974) are based on the soil fertility test, soil texture, crop to be grown, a realistic yield goal (average for past 3-5 years), and past crop. Fertilizer recommendations can then be utilized by the livestock producer to help identify on which fields manure nutrient s will have the greatest value in reducing the amounts of commercial fertilizers

needed, thereby returning the greatest economic benefit. For additional information, see the current GAAMPs for Nutrient Utilization.

- Within MANURE APPLICATION TO LAND; MANURE NUTRIENT LOADINGS section, update to include current Nutrient Management Program and Tri-State Fertilizer Recommendations (pg 18)

The rate of decomposition (or mineralization) of manure organic matter will be less than 100% during the first year and will vary depending on the type of manure and the method of manure handling. Therefore, in order to estimate how much of the total manure N in each ton, or 1000 gallons of manure, will be available for crops (and a credit against the N fertilizer recommendation), some calculations are needed. The total N and NH4-N content from the manure analysis can be used with the appropriate mineralization factors to calculate this value. Management tools to assist with these calculations include (a) *Recordkeeping System for Crop Production (E2342)--Manure Management Sheet #2* (Jacobs, 2015), (b) *Utilization of Animal Manure for Crop Production* Bulletins MM-2 and MM-3 (Jacobs 1995a and b), (c) *Nutrient Recommendations for Field Crops in Michigan* Bulletin E-2904 (Warncke *et al.*, 2009a), (d) Nutrient Recommendations for Vegetable Crops in Michigan Bulletin E-2934 (Warncke *et al.*, 2009b) or the ~~*MSU Nutrient Management (MSUNM)* computer software program (Jacobs and Go, 2001)~~Computer Assisted Nutrient Management Planning Program (CANMaPP) at https://iwr.msu.edu/canmapp/.

26. **If the Bray P1 soil test level for P reaches 150 lb./acre[2] (75 ppm), (Mehlich-3 P 202 lb./acre, 101 ppm) manure applications should be managed at an agronomic rate where manure P added does not exceed the P removed by the harvested crop. (If this manure rate is impractical due to manure spreading equipment or crop production management, a quantity of manure P equal to the amount of P removed by up to four crop years may be applied during the first crop year. If no additional fertilizer or manure P is applied for the remaining crop years, and the rate does not exceed the N fertilizer recommendations for the first crop grown). If the Bray P1 soil test reaches 300 lb./acre (150 ppm) or higher, manure applications should be discontinued until nutrient harvest by crops reduces P test levels to less than 300 lb./acre. To protect surface water quality against discharges of P, adequate soil and water conservation practices should be used to control runoff, erosion and leaching to drain tiles from fields where manure is applied.**

- Within MANURE APPLICATION TO LAND; MANAGEMENT OF MANURE APPLICATIONS TO LAND section, update to include current Nutrient Management Program and Tri-State Fertilizer Recommendations (pg 24)

Management of Manure Applications to Land

33. Records should be kept of manure analyses, soil test reports, and rates of manure application for individual fields. Records should include manure analysis reports and the following information for individual fields:

a. **Soil fertility test reports;**
b. **date(s) of manure application(s);**
c. **rate of manure applied (e.g., gallons or wet tons per acre);**
d. **previous crops grown on the field; and,**
e. **yields of past harvested crops.**

Good record keeping demonstrates good management and will be beneficial for the producer.

An important ingredient of a successful program for managing the animal manure generated by a livestock operation is "planning ahead". An early step of a manure application plan is to determine whether enough acres of cropland are available for utilizing manure nutrients without resulting in excess nutrient application to soils. This is often referred to as 'agronomic balance."

Determination of agronomic balance requires estimates of manure quantities and manure nutrients produced by different types of livestock and estimates of crop nutrient removal. Balance is most often determined for phosphorus, but may also include projections for other nutrients. Animal manure and crop removal estimates may be obtained using the following:

- Table A4 of these GAAMPs which was derived by ASAE (2014) using the default or average for each animal type. Together, Table A4 and A5 can provide further guidance regarding N losses that can occur during handling and storage or manures before they are applied.
- Nutrient Recommendations for Field Crops in Michigan Bulletin E-2904 (Warncke *et al.*, 2009a)
- Nutrient Recommendations for Vegetable Crops in Michigan Bulletin E-2934 (Warncke et al., 2009b).
- Tri-State Fertilizer Recommendations Bulletin 974 (Culman, Fulford, Camberato, and Steinke, 2020)

Computer software has been developed to assist with development of manure spreading plans, the determination of agronomic balance, and the maintenance of manure spreading-crop production records:

- ~~*MSUNM* (Jacobs and Go, 2001)2~~The Computer Assisted Nutrient Management Planning Program (CANMaPP) at https://iwr.msu.edu/canmapp/
- *Manure Management Planner* (Purdue Research Foundation, 2014)
- *Nutrient Inventory* (Koelsch and Powers, 2010; 2013).

Summary of *Nutrient Utilization and GAAMPs* proposed changes

- Updated INTRODUCTION to include updated production and use numbers. (pg 4)

> In 1920, Michigan had 19.0 million acres of cropland, but in 1970, 1990, 1999, and 2004 total land in farms had decreased to 12.7, 10.8, 10.4, and 10.1 million acres, respectively (MDARD, 1991, 2005) and 9.8 million in 2020 (USDA/NASS, 2020). As a result of modern agricultural practices, Michigan's agricultural system has become one of the most productive in the world.
>
> The median soil test level for P in soil samples received by the Michigan State University (MSU) Soil Testing Laboratory in the 1994-95 season was 106 pounds of Bray P1 per acre (Warncke and Dahl, 1995). The median soil test P-value has declined over the years from 100 pounds of Bray P1 in 2001 to 74 pounds in 2015 (Silva, 2016).

- Updated references to reflect updated fertilizer recommendation from MSU and Tri-State throughout, with additions to text where new research prompted changes.

- Within ON-FARM FERTILIZER STORAGE AND CONTAINMENT PRACTICES; FERTILIZER STORAGE FACILITIES SECTION; movement of the Regulation No 641 language into the bolded heading. (pg 6)

2. **Dry fertilizer should be stored inside a structure or device capable of preventing contact with precipitation and/or surface water. Bulk dry fertilizer should be stored in accordance with Regulation No. 641, "On Farm Fertilizer Bulk Storage," NREPA, Part 85.**

   The storage area should be able to handle and contain fertilizer spills properly. The structure or device should consist of a ground cover or base and a cover or roof top. Walls and floors should prevent absorption or loss of fertilizer. Dry fertilizer in an individual quantity of more than 2,000 pounds is considered "bulk fertilizer" and is regulated by Regulation No. 641, "Commercial Fertilizer Bulk Storage." Producers are encouraged to follow the guidance provided in Regulation No. 641 when bulk quantities of dry fertilizer are stored on their farm.

- Within FERTILIZATION PRACTICES FOR LAND APPLICATION, NITROGEN MANAGEMENT Section; bolded text GAAMP #10 & GAAMP #11 previously were split into A & B, but were updated to GAAMP #10, GAAMP #11, GAAMP #12, & GAAMP #13 to keep consistency with the rest of the document. Subsequent bolded GAAMPs were re-numbered. (pg 11 – 15)
- Minor grammatical and formatting changes throughout.
- Updated advisory committee members. (pg 45)

Summary of *Pest Utilization and Pest Control GAAMPs* proposed changes:

No Changes: review and update of references only. Includes minor formatting and web links only

Summary of *Site Selection for New and Expanding Livestock Facilties GAAMPs* proposed changes:

No Changes: review and update of formatting only.

Summary of *Cranberry Production GAAMPs* proposed changes:

No Changes: review and update of references only. Includes minor formatting and web links only.